

Notice of Allowability

Application No.

10/627,461

Examiner

Henry S. Hu

Applicant(s)

GROOTAERT ET AL

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment of February 28, 2005.
2. ☒ The allowed claim(s) is/are 1-3 and 5-10.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with **Brian E. Szymanski (tel. 651 737-9138) on April 28, 2005** to amend Claim 10 as following:

CLAIMS

Claim 10 at line 7 please replace the phrase of "the perfluoropolymer comprising" with the sentence of "the perfluoropolymer, prior to the isolation of the perfluoropolymer from the aqueous dispersion in which it was obtained, comprising"

DETAILED ACTION

2. This Office Action is in response to the Amendment filed on February 28, 2005. With the Applicants' amendment, parent Claim 1 was amended while Claim 4 was canceled. To be more specific, **Claim 1** was amended to incorporate the limitation of canceled Claim 4 so as to

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specific the perfluoropolymer being obtained from an aqueous emulsion polymerization process as well as to specify the purity of perfluoropolymer when "being prior to the isolation of the perfluoropolymer from the aqueous dispersion in which it was obtained". With the above examiner's amendment the other independent **Claim 10** was amended to specify the perfluoropolymer accordingly. **Claims 1-3 and 5-10 are pending now.** An action follows.

3. The 103(a) Claim rejections under 2nd Non-Final Office Action filed on November 26, 2004 are now removed for the reasons given in paragraphs 4-10 thereafter.

Allowable Subject Matter

4. Claims 1-3 and 5-10 are allowed.
5. The following is an examiner's statement of reasons for allowance: The above Claims 1-3 and 5-10 are allowed over the closest references:

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6. The limitation of amended parent **Claim 1** of present invention relates to **a curable fluoroelastomer composition comprising: (A) a perfluoropolymer obtained through an aqueous emulsion polymerization process and having one or more cure-sites selected from a halogen capable of participating in peroxide cure reaction and/or nitrile groups; (B) an organic peroxide and/or a compound capable of effecting curing of the perfluoropolymer through said nitrile groups; and (C) optionally a polyunsaturated coagent; wherein the**

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perfluoropolymer, prior to the isolation of the perfluoropolymer from the aqueous dispersion in which it was obtained, is essentially free of ionic end groups and wherein the total amount of metal cations in the composition is not more than 10 µg/g perfluoropolymer.

*Other parent **Claim 10** relates to fluoropolymers used in the composition of **Claim 1** but with end group free or with $-\text{CF}_2\text{Cl}$ end groups. See other limitations of dependent **Claims 2-3** and **5-9**.*

7. In view of the Applicants' amendment and examiner's amendment, both two parent **Claims 1 and 10** now carry a combination of limitations as: (A) a perfluoropolymer obtained through an aqueous emulsion polymerization process and having one or more cure-sites selected from a halogen and/or nitrile groups, and (B) the purity of perfluoropolymer, prior to the isolation of the perfluoropolymer from the aqueous dispersion in which it was obtained, is essentially free of ionic end groups and wherein the total amount of metal cations in the composition is not more than 10 µg/g perfluoropolymer. It is noted that parent **Claim 1** is a curable fluoroelastomer composition while parent **Claim 10** relates to fluoropolymers used in making the composition of **Claim 1** but with end group free or with $-\text{CF}_2\text{Cl}$ end groups.

With respect to **103 rejections** for original **Claims 1-10**, none of the three references has taught or fairly suggested such a fluorinated copolymer particularly with "the purity of perfluoropolymer, prior to the isolation of the perfluoropolymer from the aqueous

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dispersion in which it was obtained, is essentially free of ionic end groups and wherein the total amount of metal cations in the composition is not more than 10 µg/g perfluoropolymer”.

8. In a very close examination, the primary reference **Schmieg** only discloses the preparation of curable perfluoroelastomer compositions having an improved processability due to reduced levels of ionized or ionizable polymer endgroups, which can be reduced by decarboxylation of perfluoroelastomers having carboxyl or carboxylate in the end or pendant groups. Such fluoroelastomer compositions may additionally contain cure-site monomers such as nitrile-containing monomers as well as some aromatic amines such as bis(aminophenols) and bis(aminothiophenols) with organic peroxides for curing through nitrile groups in the polymers.

However, Schmieg is silent about using a fluoroelastomer prior to the isolation having the **claimed low content of metal cations, which is less than 10 µg/g polymer**. Although the combination of Beyer and Legare may teach that **such a fluoropolymers directly obtained from the polymerization process of Schmieg may be further purified to obtain high purity with metal ion content less than 500 ppb if wished, the use of Beyer and Legare to be in combination with Schmieg would no and can not overcome the limitation of Claims 1 and 10 as pointed out on pages 4-6 of Remarks by the Applicants.**

9. In a close examination of the four references cited in the **search report for Applicants’ PCT/US03/23530 (now WO 2004/011510 A1)** as disclosed in the **IDS of 10-20-2003**, the examiner confirms that **WO 01/57100 A1 to Grootaert et al.** (cited as X), **US 5,936,060 to**

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Schmiegel (cited as X), US 5,852,149 to Abusleme et al. (cited as X) and US 5,285,002 to Grootaert et al. (cited as X) all fail to teach or fairly suggest such a combination of limitations.

It is noted by this examiner that such a low level of metal ions contained in the perfluoropolymer obtained directly from polymerization is rare and difficult to achieve such a polymerization due to the contamination from many resources. However, some prior art known in the art can be followed to purify the perfluoropolymer to the claimed metal ion level.

Additionally, the present invention has shown in examples along with some comparative examples for making such cure-site containing perfluoropolymer to have such a low metal ion content without purification process (see pages 19-21 for **examples 1-2, comparative example 1** along with its **Table 1**). Therefore, all the above-mentioned references, in combination or alone, does not teach or fairly suggest the limitations of present invention.

10. After further examination and search, the examiner found the following prior art did not teach the claimed limitation:

US Patent No. 5,852,149 to Abusleme et al. only discloses the preparation of a curable perfluoroelastomer composition comprising VDF and/or TFE and at least another fluorinated ethylenically unsaturated monomer. Some Br- or I-containing cure-site monomers are included for peroxide curing (column 4, line 53-67). They are excellent in thermal stability (abstract, line

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1-6). However, Abulsleme is silent about using a fluoroelastomer composition having the **claimed content of metal cations**, which is less than 10 µg/g polymer.

11. The two key issues, regarding (A) a perfluoropolymer obtained through an aqueous emulsion polymerization process and having one or more cure-sites selected from a halogen and/or nitrile groups, and (B) the purity of perfluoropolymer, prior to the isolation of the perfluoropolymer from the aqueous dispersion in which it was obtained, is essentially free of ionic end groups and wherein the total amount of metal cations in the composition is not more than 10 µg/g perfluoropolymer, cannot be overcome by any or the combination of the above references, therefore, the present invention is novel.

12. As of the date of this office action, the examiner has not located or identified any reference that can be used singularly or in combination with another reference including the above references to render the present invention anticipated or obvious to one of the ordinary skill in the art. Therefore, the two independent **Claims 1 and 10** are allowed for the reason listed above. Since the prior art of record fails to teach the present invention, the remaining pending **Claims 2-3 and 5-9** are passed to issue.

13. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Henry S. Hu whose telephone number is (571) 272-1103. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Henry S. Hu

Patent Examiner, Art Unit 1713, USPTO

April 28, 2005



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